

- Fig. 9.* Tangential section of *Stromatopora antiqua*, Nich. & Murie, from the Niagara Limestone of Thorold, Ontario.  
*Fig. 10.* Vertical section of the same, similarly enlarged.  
*Fig. 11.* Part of a tangential section of the same, enlarged about twenty times.

## PLATE IX.

- Fig. 1.* Tangential section of *Actinostroma matutinum*, Nich. Chaleur Formation, L'Anse au Gascon, Quebec. The section cuts the laminae obliquely.  
*Fig. 2.* Vertical section of the same.  
*Fig. 3.* Tangential section of *Actinostroma Whiteavesii*, Nich. Devonian Rocks, Little Red River, Canada.  
*Fig. 4.* Vertical section of the same. The section is not strictly vertical, and the radial pillars appear therefore to be more broken and interrupted than they really are.  
*Fig. 5.* Tangential section of *Stromatopora Carteri*, Nich., from a boulder of Silurian Limestone, Hayes River, Hudson's Bay.  
*Fig. 6.* Vertical section of the same.  
*Fig. 7.* Tangential section of *Stromatopora borealis*, Nich. Silurian (Upper Oesel Formation), Kattripank, Oesel.  
*Fig. 8.* Vertical section of the same.

## PLATE X.

- Fig. 1.* Tangential section of *Actinostroma expansum*, Hall and Whitfield, sp. Devonian Formation, Rockford, Iowa.  
*Fig. 2.* Vertical section of the same.  
*Fig. 3.* Tangential section of *Actinostroma fenestratum*, Nich. Devonian Rocks, "Pentamerus Point," Lake Manitoba.  
*Fig. 4.* Vertical section of the same.  
*Fig. 5.* Tangential section of *Syringostroma nodulatum*, Nich. Corniferous Limestone, Kelley's Island, Ohio.  
*Fig. 6.* Vertical section of the same.  
*Fig. 7.* Portion of the surface of an exfoliated lamina of the same, natural size.  
*Fig. 8.* Tangential section of *Syringostroma densum*, Nich. Corniferous Limestone, Kelley's Island, Ohio.  
*Fig. 9.* Vertical section of the same.

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XXXIV.—*Notes on Slugs, chiefly in the Collection at the British Museum.* By T. D. A. COCKERELL.

[Continued from p. 107.]

VI. THE *PIRAINEA* SECTION OF *AMALIA*.

THAT section of *Amalia* which includes *A. gagates*, called by Lessona and Pollonera *Pirainea*, differs very much from *Tandonia* in its distribution. The latter is strictly confined to the European region, the occurrence of a species in

Ecuador being merely the result of an accidental importation, while *Pirainea* has species in the most distant parts of the globe, and is almost cosmopolitan in temperate regions, where the climate is damp and fairly uniform. Dryness and extremes of temperature seem unfavourable to it, so that we get no representatives in Eastern Europe, temperate Asia, or Eastern North America. In considering the species of *Pirainea*, it will be convenient to arrange them under the various regions in which they occur.

a. European Region.

*Amalia gagates* (Drap.).

A very polymorphic species, not very variable in any particular locality, but differing very much in the different regions which it inhabits. English specimens are smaller than those from the Mediterranean Region, and not so dark, being also much smoother and more pellucid. The forms found on the borders of the Mediterranean are often very large, intensely black, and quite rugose. Generally speaking, in warm climates the species seems to become darker, more opaque, and more rugose. If we compare an English example with one from Sicily it is hard to believe that they are even closely allied.

*Limax gagates*, as figured by Draparnaud (Hist. Nat. Moll. 1805, pl. ix. figs. 1, 2), looks like the English form, but is described as black, shiny, with the body striate-subrugose. This must be considered the type. It is the var. *typus* of Lessona and Pollonera, and is a phase of the species met with in many localities where *gagates* is found. It differs from the usual English race in being black and more rugose; but it is not so rugose as some of the Mediterranean forms, and is only of moderate size.

Férussac's figures of *L. gagates* (Hist. Nat. Moll. pl. vi. figs. 1, 2) resemble the English form more nearly as to colour and agree in size; but fig. 1 has the rugæ rather too strong. Moquin-Tandon's plate ii. fig. 1 is like the English race, but the mantle has small spots; these spots are not mentioned in the description.

It thus appears that *Amalia gagates* in France, although much like the English form of the species, tends to become more rugose and darker, thus approaching the southern varieties. But in the north of France at least the var. *plumbea* is found not at all different from those in England.

*Amalia (gagates subsp.) plumbea* (Moq.).

Smother than the type, but of about the same size. Colour plumbeous, usually darker on the back than at the sides. Found in many parts of England and also in France. The British Museum contains examples from Bath (*J. E. Daniel*) and South Shields (*R. Howse*).

*Amalia plumbea*, var. *olivacea* (Moq.).

Like the last, but olivaceous. England, France, and Italy. Whether the Italian form is like subsp. *plumbea* in structure and size I do not know; but *olivacea* as found in England falls under *plumbea*.

*Amalia plumbea*, var. *rava* (Wllms.).

A drab-coloured form found in the west of England. There is a specimen from Bath (*J. E. Daniel*) in the British Museum.

*Amalia plumbea*, forma nov.

Pale lavender-colour. Found in Cardiganshire (see *J. W. Taylor*, *Journ. of Conch.*, Oct. 1888, p. 360).

*Amalia gagates*, forma *typus*, Less. & Poll.

Of moderate size, rather rugose, black. Rare in England, frequent in Southern Europe. The British Museum has a specimen from Bath (*J. E. Daniel*) which may be referred to *typus*; but it has really the coloration of the American var. *Hewstoni*, being black or blackish, with the sides and sole pale.

*Amalia gagates*, forma *Benoiti*, Less. & Poll.

Black, with the keel whitish. Italian.

*Amalia gagates*, forma nov. *atlantica*.

This is based on a specimen found at Tangier, collected by Mr. J. H. Ponsonby. It may be described as follows:—

Length 28, breadth  $4\frac{1}{2}$  millim. Head black; mantle jet-black, respiratory orifice a little posterior to the middle, hinder part of mantle considerably raised; body black, slightly translucent at sides, keel entire, rugæ not well marked; body

rather smooth; foot-fringe black; sole grey and slightly translucent. Jaw dark brown, with a well-formed median projection.

This is, I presume, the same as Hesse's "*Amalia* nov. sp.?" also from Tangier; only his example was immature.

Mr. Ponsonby gave me a dried slug from Gibraltar, no doubt referable to *A. gagates*, but whether to this particular form I am not able to say.

*Amalia gagates*, var. *Bedriagæ*, Less. & Poll.

This Italian variety, as I am informed by Mr. Pollonera, is entirely black, of the same size as the type, but distinguished by having the lateral zones of the sole entirely black or blackish.

*Amalia (gagates* var. or subsp.) *mediterranea*, nov.

I apply this name to a large black subspecies found in Algeria and Sicily, in which the lateral areas of the sole tend to become dark. *A. gagates*, var. *Bedriagæ*, Less. & Poll., is very similar in colour, but is a form more closely allied to *gagates* proper.

*Amalia mediterranea*.

Length (in alcohol) 56 millim.; mantle 18 millim. long and 9 broad. Respiratory orifice  $10\frac{3}{4}$  millim. from the anterior border of mantle. Hind end of mantle to end of body  $37\frac{1}{3}$  millim. Sole  $6\frac{1}{4}$  millim. diameter, median area  $2\frac{3}{4}$  millim. diameter. Colour: all visible parts (except sole) black, anterior part of mantle free and white beneath. Sole with the median area pale ochrey and the lateral areas black. Mantle with a diamond-shaped (four-sided) sulcus; mantle coarsely rugose or wrinkled, elongate-oval, rounded in front, bluntly rounded behind, slightly emarginate at the commencement of the keel. Body elongate-cylindrical, tapering somewhat, keel only *well* developed posteriorly. Reticulations (sulci) longitudinal or simple, with a finer interstitial network. Mouth strongly wrinkled, slightly olivaceous. Sulcate lines on the sole as in *gagates*. Rugæ on body flattened. Slug rather dull black, though somewhat shiny, quite opaque.

Described from a specimen in the British Museum from East Algeria, received from Dr. Heynemann. Dr. Kobelt collected a lot of *Amalia gagates* in North Africa, and it was the opinion of the German malacologists that they could not be distinguished specifically from true *gagates*. I have com-

pared the above form very carefully with *A. gagates*, and it certainly seems worthy of a subspecific name.

*Amalia mediterranea*, forma nov. *similis*.

Length (in alcohol)  $36\frac{1}{2}$  millim.; strongly keeled, keel rather flexuose. Opaque, wrinkly-rugose, grooved lines on body well marked, and connected by a network of smaller ones. Colour black, except sole, mouth-parts, and parts covered by the mantle, which are pale ochrey. Mantle emarginate behind. Lateral areas of sole narrower together than median area and greyer, in fact quite greyish, the median area being ochrey. Sole 6 millim. broad, median area  $3\frac{1}{2}$  millim. broad.

Described from a specimen kindly sent to me by Mr. Pollonera, found at Catania, Sicily. It is evidently very close to the Algerian form described above, but not identical. In Lessona and Pollonera's 'Monograph,' p. 59, there is a reference to this Catania variety under *A. gagates*. Mr. Pollonera tells me that the sides of this form are sometimes pale.

*Amalia ichnusæ*, Less. & Poll.

A Sardinian form, perhaps a variety of *gagates*, from which it differs only by its smaller size and somewhat in its genitalia. Mr. Pollonera thinks that this might better be considered a subspecies or variety of *gagates* than any of the three Sicilian species described by him which have been referred thereto.

*Amalia Doderleini*, Less. & Poll.

Found at Palermo, and recognized by the black band on the mantle, which Mr. Pollonera says is never seen in the pale varieties of *gagates*.

*Amalia (Monterosati, var.?) sicula*, Less. & Poll.

This Palermo species, Mr. Pollonera informs me, is larger than the Catania *gagates* (my *similis*), much less rugose, and the shell is quite different, being like that on which Bourguignat founded his genus *Palizzolia*.

*Amalia (scaptobia var.?) insularis*, Less. & Poll.

A third species found at Palermo. Mr. Pollonera tells me it externally resembles *carinata*, Risso, much more than

*gagates*, but it approaches the latter in its genitalia. The mantle is mottled. Dr. Simroth has considered *Doderleini*, *sicula*, and *insularis* to be synonyms of *gagates*; but Mr. Pollonera writes (*in litt.* Jan. 13, 1891) that to him a *specific* character of *gagates* is its *lack of spots or bands*, and for this reason he cannot accept the proposed synonymy. He also observes that *insularis*, *Doderleini*, and the Algerian *scaptobia* all have the summit of the keel pale, while in *gagates* this is of the same colour as the back, except in the var. *Benoiti* from Messina, which was founded on a single specimen, and may be an individual abnormality.

*Amalia scaptobia* (Bourg.).

Found in Algeria and referred by Heynemann to *gagates*.

Mr. Pollonera writes that it was evidently described from a juvenile, but it is a spotted species, and therefore cannot be *gagates*.

Probably *A. insularis* of Sardinia and Sicily will prove to be a form of *scaptobia*.

*A. eremiophila* (Bourg.) from Algeria and *A. atrata* (Mab.) from Portugal are species of this section only known to me from what is published concerning them. This completes the series of European forms if we include *A. nigricans* (Schultz), which has not been identified by modern authors, and *A. Monterosati* (Bourg.), which is described from the shell alone, and is perhaps *A. sicula*, over which it has priority.

b. Atlantic Islands.

This geographical division will be thought perhaps a rather peculiar one, the more frequent custom being to treat of the islands under the heads of the continents to which they are nearest. Thus the Bermudas, as regards their general fauna, are distinctly American, while Madeira presents affinities with the western Mediterranean region. But so far as regards the slugs now under consideration, it may be said that all the insular forms are very much alike, and as many of the insular occurrences are doubtless the result of accidental introduction by human means, this is not surprising.

It might well be supposed that the wide distribution of *Pirainca* in islands and elsewhere was simply the result of accidental importations, and the slight changes from the type observable in many localities are certainly not greater than those which are known to have taken place in the case of



certain imported Mammals in the Falkland Islands; but in New Zealand there are native species, found nowhere else, which can hardly have sprung from ancestors brought there by human means.

The existence of peculiar species in New Zealand (and others reported from Tasmania) thus throws some doubt on the otherwise natural supposition that the insular, South African, and Western American forms of *A. gagates* were imported from Europe; and when we consider the very out-of-the-way localities in which they have been found, the theory of human accidental interference seems still less universally applicable.

Where, however, we find islands with no peculiar species of slugs, but with such cosmopolitan forms as *Amalia gagates*, *Agriolimax agrestis*, and *Limax flavus*, the probability that these have been introduced becomes practically a certainty, and "new species" described in the faunæ of oceanic islands must be looked on with suspicion when they belong to *Limax*, *Amalia*, or *Agriolimax*.

#### i. Madeira.

##### *Amalia (gagates subsp.) drymonia* (Bourg.).

Bourguignat appears never to have seen the various slugs he named *drymonius*, *abrostolus*, *calendymus*, and *polyptyelus* in Amen. Mal. vol. ii. (1859), and their characters are probably for the most part imaginary. *Amalia drymonia*, founded on Albers's account of the Madeiran *A. gagates*, is allied to the form *Benoiti*, to judge from the description; but whether any white-keeled *Amalia* really exists in Madeira seems at least questionable. The figures of the Madeiran and Canarian slugs given by Albers and d'Orbigny are so evidently coloured without serious regard to truth that species founded upon them cannot possibly be accepted as valid unless specimens resembling the figures should be found.

##### *Amalia gagates*, var. nov. *maderensis*.

Length (in alcohol) 14 millim., uniform dark brown, including foot; mantle blackish. The colour suggests *A. fuliginosa*.

Very near *gagates*, from which it differs only in colour, so far as I can see. Middle zone of sole more than twice as broad as either lateral zone; sulcations on sole as in *gagates*. Sole dark brown, unicolorous. Mantle oval. Keel not strong.

Madeira (*Mr. Mason*); one specimen in the British Museum.

## ii. Canary Islands.

*Amalia gagates*, var. *carinata* (d'Orb.).

The figure given by d'Orbigny of this Teneriffe slug suggests at first sight some *Parmacella*; but a careful examination of his account of the species leaves little doubt that it is a form of *A. gagates*. There is no occasion to keep the spelling of the text "*caremata*," as it is evidently a misprint, and is given correctly (*carinata*) on the plate. Bourguignat's *Limax polyptyelus* was founded on d'Orbigny's figure, the new name being proposed because *carinata* was preoccupied for a European species.

## iii. The Azores.

*Amalia gagates* has been recorded from these islands.

## iv. Bermuda.

In the British Museum are three examples of *Amalia gagates* from Bermuda ('Challenger' collection). These were recorded by Mr. E. A. Smith (P. Z. S. 1884, p. 276). They belong to form *typus*, Less. & Poll., but are rather more opaque and rugose than is usual, and the keel is flexuose.

## v. Ascension.

*Amalia gagates*, var. *ascensionis* (Lesson).

The published figure of this is a bad one, but it is no doubt a variety of *gagates*. The subgeneric term *Clytropelta*, Heyn., proposed for it is therefore quite unnecessary.

It is very interesting to find that this variety, collected so many years ago, resembles in colour the forms found at St. Helena, Tristan d'Acunha, and Juan Fernandez. Whether the Ascension slug is not really a subspecies indigenous to that island is perhaps open to question; but it seems more likely that here, as on the other islands, we have simply the descendants of imported *A. gagates*, which have already begun to diverge from the type. It would be an interesting experiment to bring some of these slugs to Europe and breed them in captivity, and see whether they kept true or reverted to the coloration of the European type.



## vi. St. Helena.

*Amalia gagates* (var. *ascensionis*), forma nov. *helencæ*.

Mantle 7 millim. long (in alcohol), 5 millim. broad; sole  $3\frac{1}{2}$  millim. broad. Respiratory orifice 5 millim. from anterior border of mantle. Colour dull palish ochrey, back darkish purplish grey; mantle purplish grey, except sides below sulcus, which are pale ochrey, rather sharply defined from the dark part by the sulcus. Neck bluish grey above. Body keeled strongly its whole length. Median area of sole not quite twice as broad as either lateral area. Sole with strong, transverse, oblique grooves meeting in the middle line. Body simply reticulate-grooved, but the interstices themselves finely reticulate-grooved. Keel not obviously paler than the back. Sides of sole with transverse grooves and one longitudinal groove.

St. Helena (*J. C. Melliss*); one specimen in British Museum.

Compared with subsp. *plumbea* from South Shields it is evidently very closely allied; but the median area of the sole is narrower. Its rugosity may partly be due to strong alcohol having produced extreme contraction.

## vii. Tristan d'Acunha.

*Amalia gagates* (var. *ascensionis*), forma nov. *tristensis*.

Sole and sides yellowish, back and mantle plumbeous; rugæ rather strong.

Tristan d'Acunha ('Challenger' coll.); one specimen in the British Museum.

This is very near to subsp. *plumbea* and still nearer to form *helencæ*. It is not confined to Tristan d'Acunha, being also found in Juan Fernandez. It is most instructive to find that an apparently introduced species has varied in the same way on two islands so far apart as these, but at approximately the same latitude and with probably very similar climates. The St. Helena form, from a warmer climate, is not identical, but still very closely allied. It is also to be noticed that the forms of the south temperate region come to resemble the *plumbea* of North-western Europe, while those from intermediate localities are different.

## c. The Cape Region.

*Amalia capensis* (Krauss).

*Limax capensis*, Krauss, Südaf. Moll. 1848, p. 73.

Whether this is really a species of *Amalia* peculiar to the

Cape I cannot say. It does not agree with *A. gagates*, so far as one can judge from the description.

*Amalia gagates*, forma *typus*, Less. & Poll.

Port Elizabeth (*J. H. Ponsonby*), three specimens; and Cape of Good Hope, Nov. 1873, one specimen; all in the British Museum.

These are quite like European examples.

*d.* South America.

Heynemann has recorded *A. gagates* from Brazil.

*e.* North America.

In North America *Amalia* is confined to the Pacific region.

*Amalia gagates*, var. *Hewstoni* (J. G. Cooper).

*Limax Hewstoni*, J. G. Cooper, Proc. Ac. Nat. Sci. Philad. 1872, p. 147.

I received a living example of *L. Hewstoni*, collected at Haywards, California, from Dr. J. G. Cooper, and was able to make a drawing of it, which was published by Mr. W. G. Binney in his Third Suppl. to Terr. Moll. U. S. (1890), pl. viii. fig. 1. The figs. D on the same plate had been made from an alcoholic example previously, and are not so good. The living specimen from Haywards was about 50 millim. long; sole dull greyish ochreous, about 5 millim. broad. Body blackish above, lighter at sides. Mantle  $13\frac{1}{2}$  millim. long. Eye-peduncles blackish, lower tentacles pale. Respiratory orifice scarcely posterior to the middle of the mantle. Keel inconspicuous in the living slug, but strong when contracted in alcohol.

When immersed in alcohol the median area of the sole appeared grey, conspicuously darker than the lateral areas. I dissected the specimen and found the genitalia to agree with *A. gagates* in all essential points. The penis-sac is thick at its extremity. The spermatheca is globular and rather large. The albumen-gland is large and yellowish.

I have also received var. *Hewstoni* from Cœur d'Alene, Idaho (*H. F. Wickham*), and Mr. W. G. Binney has sent me two examples from Oakland, California, where they were collected by Mr. Hemphill in 1890. Mrs. M. E. Cusack sent me a drawing of var. *Hewstoni*, made from a specimen found by Miss Mora Cusack at Santa Barbara, California.

There can be no doubt that *L. Hewstoni* is correctly referable to *A. gagates*, and it differs very little from the type.

*Amalia gagates*, var. *plumbea*.

A *plumbea* form occurs with var. *Hewstoni*, or at least in the same region. A specimen in alcohol sent to me by Mr. Binney was 18 millim. long, back very sharply keeled, sole pale orange-yellowish, posterior edge of mantle pale. Reti-culations as in var. *Hewstoni*. General colour leaden grey. Liver ochreous. This specimen was found by Mr. Hemphill in North Idaho or Washington, the exact locality not being known.

A large specimen of var. *plumbea*, collected by Mr. Hemphill at Julian City, California, was sent to me by Mr. Binney more recently.

This var. *plumbea* is really a subvariety of *Hewstoni* which has the colour-character of the European subsp. *A. plumbea*, but is not sufficiently segregated to be considered a subspecies.

f. Pacific Islands.

In the British Museum is a specimen of *Amalia fuliginosa* (Gould) marked "Polynesian Islands" (*S. Stevens*). It is uniform sooty (black-brown), including sole; not very rugose; transverse grooves on back hardly noticeable, though the longitudinal ones are plain. The median area of the sole is narrower than in New-Zealand examples; but I think they cannot be separated even as varieties.

i. Juan Fernandez.

*Amalia gagates*, forma *tristensis*.

There are six specimens from Juan Fernandez ('Challenger' coll.) in the British Museum, which may be described as follows:—

Blackish or greyish above, sides and sole more or less yellowish. Region of respiratory orifice yellow. Interstices of the main rugæ on back inclined to be dark. Opaque slugs, with the rugæ rather strong.

ii. Sandwich Islands.

*Amalia sandwichensis* (Eydoux).

The figure of this species given in Tryon's work evidently represents an *Amalia*, and probably a form of *A. gagates*.

There appears to be some confusion about the species formerly called *Limax sandwichiensis*, and Heynemann ('Die nackte Landpulum. des Erdbodens,' p. 70) records an *Agriolimax sandwichiensis* (Souleyet) from the Sandwich Islands, said to be almost identical with *A. lævis*, but makes no mention of the *Amalia*.

### iii. New Caledonia.

#### *Amalia mouensis* (Gassies).

*Limax mouensis*, Gass. Act. Soc. Linn. Bordeaux, xxviii. (1871).

This supposed species was described from the shell only, which appears from the description to be that of an *Amalia*.

### g. New Zealand.

#### *Amalia fuliginosa* (Gould).

Length (in alcohol) 22 millim.; sole broadish, very dark brown or blackish, marked as in *gagates*, but median area about twice as wide as either lateral area. Mantle oval, rugose, black, with the usual sulcus. Body black, but sides below mantle brownish. Reticulations apparently as in *A. gagates*. Keel distinct. The brown parts incline to a sort of olivaceous tint.

Another example is browner and has the median area of sole grey and lateral areas brownish. One large one contains dull yellow globular eggs, which have diam.  $2\frac{2}{3}$  millim.

Described from specimens in the British Museum from New Zealand (*Mr. Macgillivray*).

I have no doubt that this is a good species, although closely allied to *A. gagates*. It is certainly the *Limax fuliginosus* of Gould, a species which I am glad to have the opportunity of redescribing, as it has not been recognized by recent authors. It is smoother than *A. antipodarum*, and differs from it in various ways.

#### *Amalia antipodarum* (Gray).

*Milax antipodarum*, Gray, Cat. Pulm. 1855.

Length (in alcohol) 16 millim., mantle 6 millim. long. Sole and ground-colour a sort of coffee-brown; back, mantle, and neck above becoming black. Mantle truncate behind; sulcus well marked; respiratory orifice rather posterior. Keel strong. Rugæ as in *A. gagates*, back rugose and opaque. Sole rather lively brown, the median area hardly

twice as wide as one lateral area; striæ on sole as in *A. gagates*.

Described from two specimens, doubtless Gray's types, in the British Museum. This species differs little from *A. gagates* except in colour.

*Amalia antipodarum*, var. nov. *pallida*.

Length (in alcohol)  $21\frac{1}{2}$  millim.; sole pale ochrey, unicolorous, median area hardly twice as wide as either lateral area; sole-striæ as in *A. gagates*. Reticulation on body as in *A. gagates*. Mantle dark greyish, with the edges pale and the sulcus dark. Neck above dark grey. Body well keeled, whitish, greyish on each side of keel. Respiratory orifice rather posterior. Not a *rugose* slug.

Described from a specimen from Wellington (Otago University Museum).

*Amalia antipodarum*, var. *emarginata* (Hutton).

*Limax emarginatus*, Hutton, Man. N. Z. Moll. 1880, p. 26.

Length (in alcohol) 27 millim.; sole and sides whitish, back dark greyish. Keel more or less pale. Median area of sole narrower than both lateral areas together. Sulcus on mantle not darker than the rest of the mantle.

Described from a specimen found at Dunedin (Otago University Museum), in the British Museum. Closely allied to var. *pallida*, from which it differs noticeably in its concolorous mantle-sulcus. It does not appear to me that *antipodarum*, *pallida*, and *emarginata* are more than three varieties of a single species.

*h. Australia.*

*Amalia maura* (Quoy & Gaim.).

*Limax maurus*, Quoy et Gaimard. (*Hab.* Port Jackson.)

*Limax olivaceus*, Gould. (*Hab.* Paramatta.)

*Limax pectinatus*, Selenka, Mal. Blätt. 1865, p. 105. (*Hab.* Sydney.)

This Australian species is evidently very close to *A. gagates*, but is probably a valid species. The supposed species *A. maura* (Q. & G.), *A. olivacea* (Gld.), and *A. pectinata* (Sel.) are all from the same neighbourhood, and as the descriptions agree in all important points, there need be no question about uniting them. The oldest name, *A. maura*, has been quite overlooked, the *Limax maurus* of Quoy and Gaimard remaining unidentified by authors.

Tate has described two species, *A. nigricollis* and *A. tasmanica*, from Tasmania; I have not seen specimens of either of them.

3 Fairfax Road, Bedford Park, Chiswick, W.,  
January 25, 1891.

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XXXV.—*Remarks on the Herpetological Fauna of Mount Kina Baloo, North Borneo.* By G. A. BOULENGER.

THE first Reptiles and Batrachians obtained on Kina Baloo were described by me in 1887\*, four new species being established. The specimens, which were the property of Mr. W. Whitehead, did not find their way to the British Museum; for on his return home Mr. Whitehead disposed of them, together with many others which he had collected in North Borneo and Palawan, in favour of the Paris Museum. I am glad to say that recently, through the kindness of Prof. Vaillant, duplicate specimens from that collection have been received by the British Museum. So that of the twelve valid new species discovered by Mr. Whitehead on Mount Kina Baloo as many as five are now represented by types or co-types in the National Collection. Mr. Whitehead's collection of Reptiles and Batrachians formed the subject of an extensive paper by Dr. F. Mocquard †, in which numerous species and two genera are described as new, and upon which I now beg to offer some remarks.

On receiving at the end of January of this year a copy of Dr. Mocquard's paper, I wrote to the author that, whilst regarding his *Gymnodactylus baluensis*, *Hemidactylus craspedotus*, *Ablabes præfrontalis*, *Culamaria lateralis*, *Helicopsoides typicus*, *Rhacophorus acutirostris*, *Bufo fuliginosus*, *B. spinulifer*, *Nectophryne misera*, and *N. maculata* as valid species, I entertained serious doubts respecting the others, which I felt inclined to identify as follows:—

*Pelturagonia cephalum* = *Japalura nigrilabris*, Ptrs.

*Tropidonotus maculatus*, var. *torquatus* = *T. chrysargus*,  
Boie.

*Rana decorata* = *R. luctuosa*, Ptrs.

\* Ann. & Mag. Nat. Hist. (5) xx. pp. 95–97.

† Nouv. Arch. du Mus. (3) ii. 1890, pp. 115–168, pls. vii.–xi. Preliminary diagnoses were published in 'Le Naturaliste' for 1890.